

THE DISPERSAL OF LAND SHELLS BY THE AGENCY OF MAN.

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Read 12th June, 1908.

DURING the past year some interesting cases of shell dispersal have come to my notice, which I think are worth placing on record.

In June, 1905, I read a paper before this Society on "The Extension of the genus *Macrochlamys* to the Island of Mauritius," based on specimens collected and sent to me by Monsieur E. Dupont, of that island. There were two species—one (A) in its shell, having a very short right shell-lobe, the other (B) only the animal, no shell (*vide* Proc. Malac. Soc., vol. vi, pl. xviii, figs. i and vii respectively). The form of the left shell-lobe also differed in the two species (figs. ii and vi). The species A was dissected and its anatomy found to be in every respect similar to the typical Indian species of the genus. I could not, however, at the time match the shell with any species known to me and in my collection at that date.

Since then I have received, through the kindness of Mr. F. Ede, of Silchar, Cachar, Assam, a number of species, preserved beautifully in spirit, found in that district, and among them is a shell which tallies exactly with the Mauritian one in form, colour, and sculpture. The only difference I notice lies in the colour of the animals, those from Cachar being extremely colourless, not gray; but this may be due to the alcohol having bleached the animals. This Cachar shell is an undescribed form or variety of *Macrochlamys indica* of Calcutta.

I think we may assume the two species to be identical, and that the home of the Mauritian shell was Cachar. The manner of its transit I believe to be as follows:—There is a very numerous Hindustani population in the Mauritius, and a large proportion of them are rice-eaters. In the districts of Sylhet and Cachar the principal cultivation is rice, which is exported in boats, almost direct from the threshing-floors near the villages in the form of *dhan*, i.e. the unhusked grain. The large grain-boats drop down the River Soorma to the Brahmaputra, and on to Calcutta or Chittagong, their cargoes to be finally shipped in steamers and native sailing craft to the Mauritius and other places. While the unhusked rice is lying on the threshing-floors, open to the air, there is nothing to prevent these snails and fertile eggs getting mixed up in the grain and retaining their vitality until turned out upon the floors of the grain-yards in the Mauritius or elsewhere, and in sufficient numbers to become established, particularly as the threshing-places have frequently plantain-trees growing near them, a favourite haunt of species of *Macrochlamys*. The time of transit would not be very long, and the *dhan* would be sufficiently damp to keep them alive.

The dispersal of our common slugs to many parts of the world is well known; they make themselves quite at home at the Cape, in Australia, and the Mascarene Islands. Among a collection of shells in spirits sent me by Mons. E. Dupont, was a tube of slugs. On

first examination they appeared to have a very decided European look, and on dissection a comparison with the admirable figures and descriptions in Mr. John W. Taylor's "Monograph of the Land and Freshwater Mollusca of the British Isles," which is quite an indispensable work, showed them to be without doubt *Agriolimax agrestis*. Very shortly after this I received from Dr. N. Annandale, Superintendent of the Indian Museum, Calcutta, some material he had collected in the N.W. Himalaya on a trip in the hills near Simla. Again an undoubted European slug turned up in *Agriolimax maximus*, var. *unicolor*, corresponding with fig. 4, pl. vi of the above monograph. The examination of the anatomy was equally satisfactory.

The discovery of this species is most interesting, because it was found on the Tibet road, some 30 miles beyond Simla. In that station, where its numerous residents must frequently be receiving plants and roots, such as dahlias, from England, the introduction of our common slugs is to be expected. Dr. Annandale mentioned to me that close by where he took this *Agriolimax*, crawling over the rocks by the roadside, a fruit orchard had lately been established. If these young trees had been brought from Simla there is a possible means of further extension; once established, there are many ways in which this slug might be carried about, a very possible one being upon the loads carried on the backs of coolies, who frequently put down their loads on the rocks by the roadside when resting and cooking their meals.

When I was in Calcutta in 1876-7 an African species of *Achatina* had spread all over the gardens in Chowringhi and the suburbs to Howra on the other side of the River Hoogly and to Barrackpur, about 15 miles north. It had been introduced originally into Calcutta by Mr. Benson some 20 years before, after his arrival from the Cape and the Mauritius. Among some shells in spirit sent me last year by Dr. Annandale, collected at Rajmahal, which is some 170 miles from Calcutta on the line of railway, were three very young specimens of this *Achatina*. In this case their transport has probably been on the railway trucks, either by crawling on to them or their being loaded up with country produce. Spread of land shells in this way would be very rapid.
